ZooKeys 138: 93–108 (2011)
doi: 10.3897/zookeys.138.1849
www.zookeys.org

RESEARCH ARTICLE

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On a new *Dictyna* species (Araneae, Dictynidae) from the northern Palaearctic confused with the East Siberian *D. schmidti* Kulczyński, 1926

Yuri M. Marusik[1,2†], Niclas R. Fritzén[2,3,§]

1 *Institute for Biological Problems of the North, Portovaya Str. 18, Magadan 685000, Russia* **2** *Zoological Museum, University of Turku, FI-20014 Turku, Finland* **3** *Klemetsögatan 7B7, FI-65100 Vasa, Finland*

† *urn:lsid:zoobank.org:author:F215BA2C-5072-4CBF-BA1A-5CCBE1626B08*
§ *urn:lsid:zoobank.org:author:28E3239D-E31B-49B4-AE8D-90A9896DAE49*

Corresponding author: *Niclas R. Fritzén* (nrfritzen@gmail.com)

Academic editor: *Dmitry Logunov* | Received 26 July 2011 | Accepted 18 August 2011 | Published 19 October 2011

urn:lsid:zoobank.org:pub:A9A4E0E0-D8B4-4D76-998F-307C4EB33786

Citation: Marusik YM, Fritzén NR (2011) On a new *Dictyna* species (Araneae: Dictynidae) from the northern Palaearctic confused with the East Siberian *D. schmidti* Kulczyński, 1926. ZooKeys 138: 93–108. doi: 10.3897/zookeys.138.1849

Abstract

A new species, *Dictyna palmgreni* **sp. n.**, is described from Finland and Russia on the basis of both sexes. Most of the earlier records of *D. schmidti* Kulczyński, 1926 from the northern Palaearctic refer to this new species. *D. shilenkovi* Danilov, 2000, **syn. n.** from Cisbaikalia is synonymised with *D. schmidti*. The general appearances and copulatory organs of *D. palmgreni* **sp. n.**, *D. schmidti* and *D. major* Menge, 1869 are illustrated. The distribution of *D. palmgreni* **sp. n.** and *D. schmidti* is clarified. An unknown sac-like structure of the spermathecae of Dictyninae is briefly discussed.

Keywords

spiders, Siberia, Palaearctic, Russia, Finland, epigyne, receptaculum

Introduction

Dictynidae is a globally distributed medium-sized family with 566 chiefly cribellate species belonging to 50 genera (Platnick 2011). The largest dictynid genus is *Dictyna* Sundevall, 1833. It encompasses 123 species distributed mainly in the Holarctic Re-

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gion (Platnick 2011). Although *Dictyna* is a fairly large genus and its representatives are rather common, this genus has never been revised on a wide scale. The only detailed revision made for the Nearctic fauna is that by Chamberlin and Gertsch (1958).

The family, and the genus *Dictyna* particularly, is relatively well studied in northern Europe and Asia. Nevertheless, several species occurring in Siberia and northern Europe remain inadequately studied and are known from the original descriptions or from one sex only. The Siberian Dictynidae have been treated by Kulczyński (1908, 1916, 1926), Marusik (1988), Danilov (1994, 2000) and Marusik and Koponen (1998).

The species *Dictyna schmidti* was described from Kamchatka by Kulczyński (1926) on the basis of a single male. Later this species was redescribed on the basis of Finnish specimens (Lehtinen 1967). Reasoning from Lehtinen's illustrations, this species was reported from other localities in Finland and adjacent Russia (Palmgren 1977) and Sweden (Pettersson 1996, Almquist 2006). *D. schmidti* was also reported from several localities in the Urals (see references in Esyunin and Efimik 1996) and Siberia (see Mikhailov 1997, Danilov 2000). While studying spiders of Siberia and Finland we have found specimens that match Lehtinen's (1967) and Palmgren's (1977) illustrations of *D. schmidti*. Yet, we have found a few specimens from eastern Siberia that clearly differ from *D. schmidti* sensu Lehtinen (1967) but well match Kulczyński's description. A comparison of these specimens led us to the conclusion that the widespread species (from Fennoscandia to eastern Siberia) known earlier as *D. schmidti* in fact belongs to a new species, the description of which is the main goal of this paper.

Material and methods

Specimens were photographed using either a JEOL JSM-5200 scanning electron microscope or an Olympus E-520 camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum, University of Turku. Drawings were made either by using a grid method with a MBS-9 stereomicroscope or a Leitz stereomicroscope with a camera lucida. Macerated epigynes were temporarily coloured with Chlorazol Black to make some parts more visible. Photographs were taken with specimens in dishes with alcohol and paraffin on the bottom. Holes of different sizes were made in the paraffin to keep the specimens in the appropriate position. The epigynes were macerated either with KOH solution or lactic acid. All measurements are in mm.

Acronyms for depositories: Zoological Museum, University of Turku, Finland (ZMT); Zoological Museum, University of Helsinki, Finland (ZMH); Zoological Museum of the Moscow State University, Russia (ZMMU); Swedish Museum of Natural History, Stockholm, Sweden (NHRS); Perm State University, Russia (PSU); Institute for Biological Problems of the North, Magadan, Russia (IBPN); Institute for Systematic and Ecology of Animals, Novosibirsk, Russia (ISEA); private collection of the second author, Vasa, Finland (NRF).

Species survey

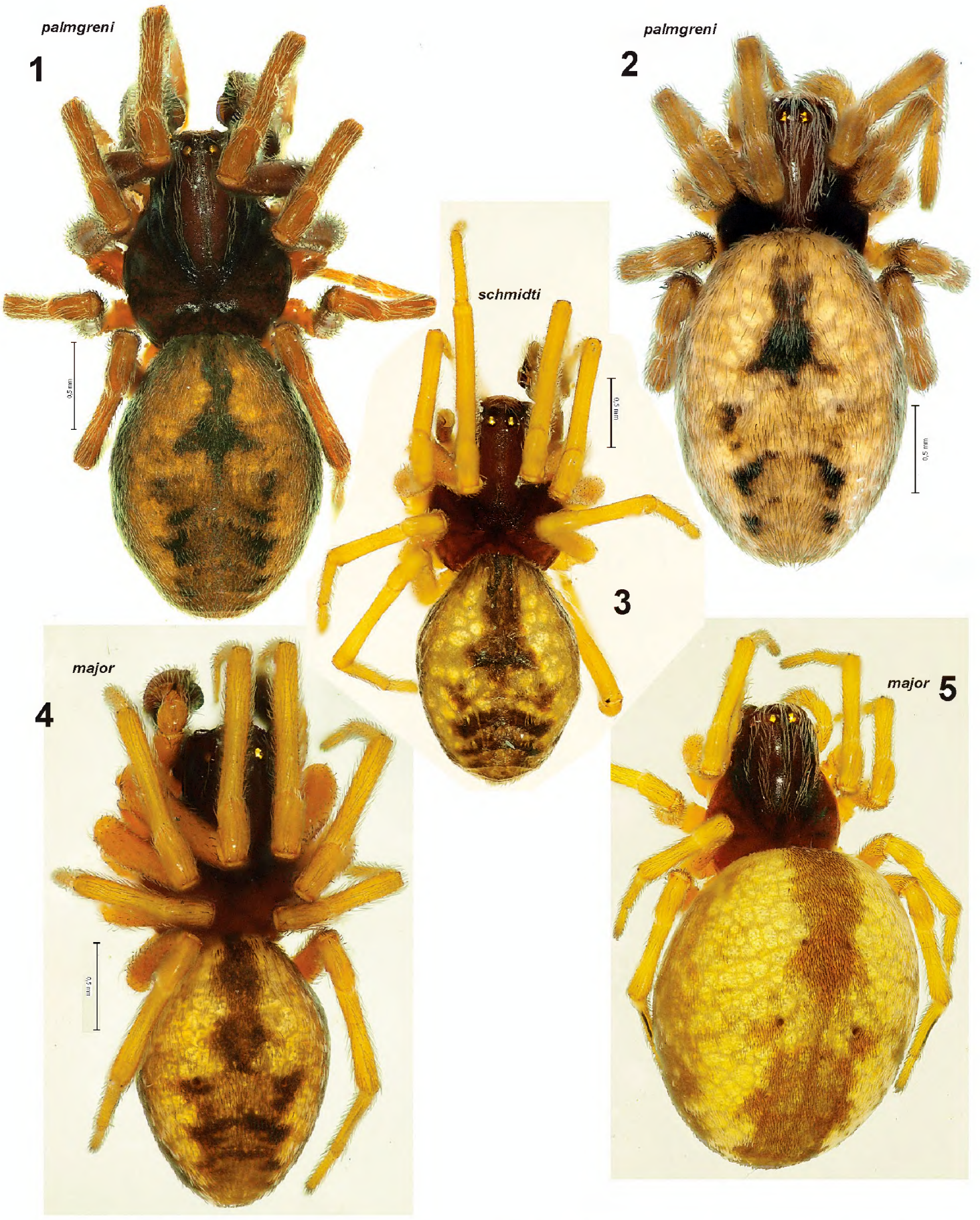
***Dictyna palmgreni* sp. n.**
urn:lsid:zoobank.org:act:EE0F36A3-845C-4667-A447-84C10B75AF2F
http://species-id.net/wiki/Dictyna_palmgreni
Figs 1–2, 6–9, 12–13, 18–19, 22–23, 28–30, 32–33, 40

D. schmidti: Lehtinen 1967: 451, f. 292, 306; 452, f. 321 (♂♀).
D. schmidti: Palmgren 1977: 21, f. 4.7-9 (♂♀).
D. schmidti (sensu Lehtinen): Danilov 2000: 42, f. 15-16 (♀).

Faunistic references
D. cf. major: Marusik et al. 1992: 137.
Dictyna sp.: Marusik et al. 1993: 71.
D. schmidti (sensu Palmgren): Esyunin & Efimik 1996: 136.
D. schmidti (sensu Lehtinen): Pettersson 1996: 224.
D. schmidti (sensu Lehtinen): Logunov et al. 1998: 131.
Dictyna cf. schmidti: Marusik et al. 2000: 21.
D. schmidti: Almquist 2006: 315 (possibly misidentification).

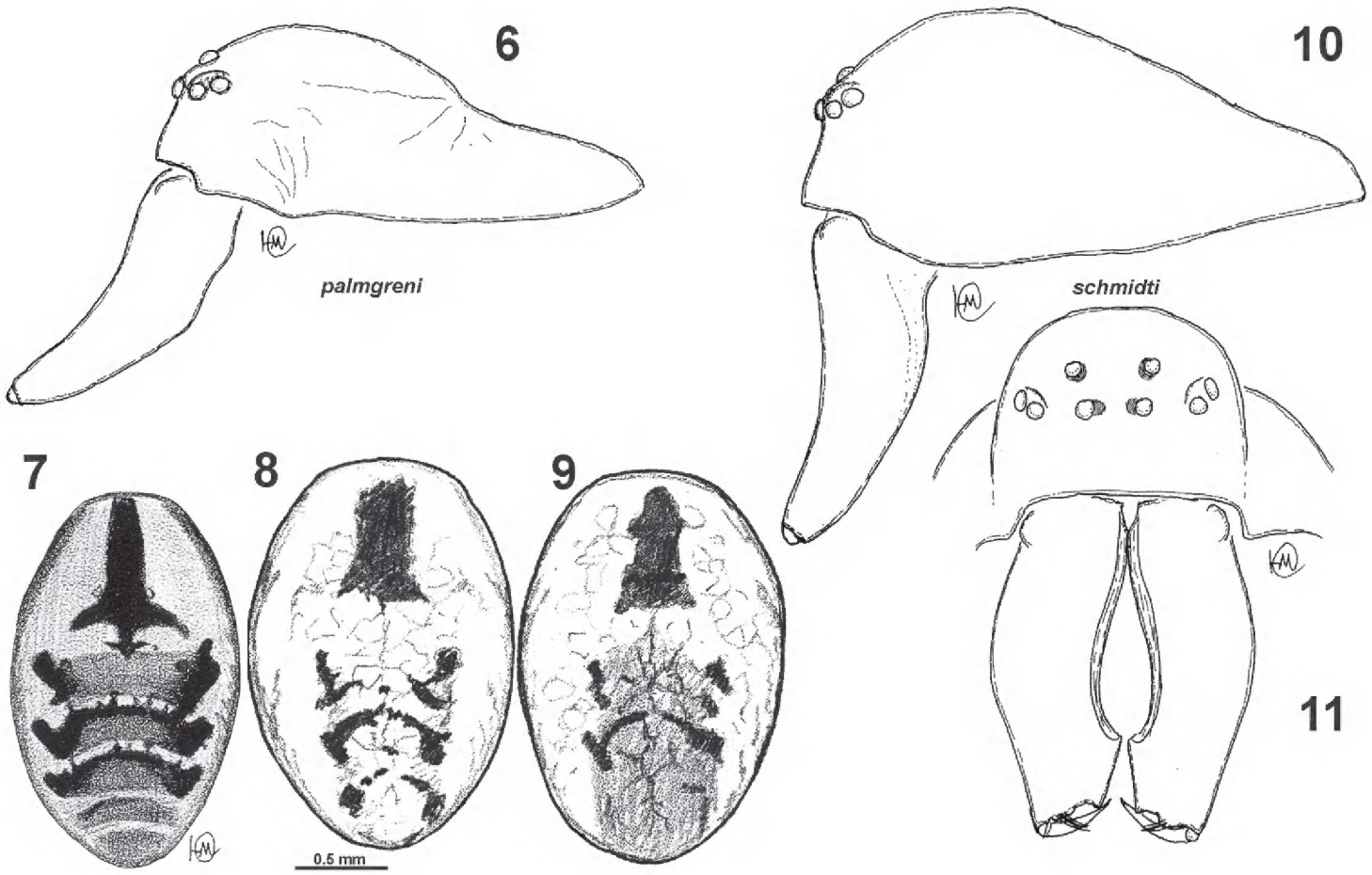
Etymology. The specific name is a patronym in honour of the late Prof. Pontus Palmgren (1907–1993) who made a great contribution to studies of Finnish spiders.

Material examined. FINLAND: Holotype ♂ (ZMT), Muonio, Pallastunturi national park (np), SE slope of Laukukero, 68°02'53"N 24°03'25"E, 31.05.2008, beaten from lower spruce branches at alpine tree line (N.R. Fritzén). **Paratypes:** 1♀ 4j (ZMT), same data as holotype; 2♂ 3♀ 9j (ZMT), Muonio, Pallastunturi np, 67°58'50"N 24°04'23"E, 29.05.2007, spruce fen, at the border of a small open bog, beaten from lower spruce branches (N.R. Fritzén); 1♂ (ZMT), Muonio, Pallastunturi np. 67°58'47"N 24°04'23"E, 29.05.2007, small semi open bog, sweeping (N.R. Fritzén); 2♂ 1♀ 4j (ZMT), Muonio, Pallastunturi np, SE slope of Laukukero, 68°02'52"N 24°03'35"E, 27.05.2007, beaten from lower spruce branches near alpine tree line (N.R. Fritzén); 1♀ (ZMT/VR90), Kittilä, Alakylä, 67°21'N 24° 53'E, 17.06.1963 (P.T. Lehtinen) (referred to as allotype of *D. schmidti* in Lehtinen (1967) and Palmgren (1977); 1♀ 1j (ZMH), Muonio, kirkonkylä, 67°56'N 23°41'E, 14.07.1943, swampy forest (P. Palmgren); 1♂ (ZMH), Kittilä, 67° 39'N 24° 54'E, ?1857 (Nylander & Gadd) (labelled as *D. schmidti* ssp. *abieticola* ♂ holotype by P.T. Lehtinen); 1♂ (ZMH), Kalajoki, Pentti isl., 64°11'14"N 23°41'53"E, 8.07.1999, pitfall trap in mesic heath forest with dense stand of *Picea abies*, (M. Sievänen). **RUSSIA**: ***Murmansk*** Area: 3♀ 5j. (ZMH) (Lt) Lotta river, 50 km E of Finnish frontier, 9.08.1967 (M. Meinander). ***North Urals***: 2♀ (NHRS), Vishorski Reserve, Ol'khovka River, forest, 13.7.1994 (O. Garkunova). ***Middle Urals*:** 6♀ (PSU), Basegi Mnt., for-



Figures 1–5. Habitus of *Dictyna palmgreni* sp. n. **1–2** from Pallastunturi, *D. schmidti* **3** from Yakutia and *D. major* **4–5** from Pyhtää. **1, 3–4** male; **2, 5** female.

est, branches of *Picea*, 1.09.1990 (S.L. Esyunin). ***Yamal Peninsula*:** 3♀ (2 with missing epigynes) (PSU), *South Yamal*, Khadyta-Yakha River, mixed forest, 06.1982 (S.L. Esyunin). ***Krasnoyarsk*** Province: 1♂ (ISEA), West Sayany, south macroslope of Oiskiy Mt. range, 11 km S of Oiskoye Lake, Buiba River valley, 52°47'N 93°18'E, 1200-1230 m, 20-21.06.1995 (A. Abramov). ***Yakutia*:** 1♂3♀ (ZMMU), Yakutia, Lena River, 10

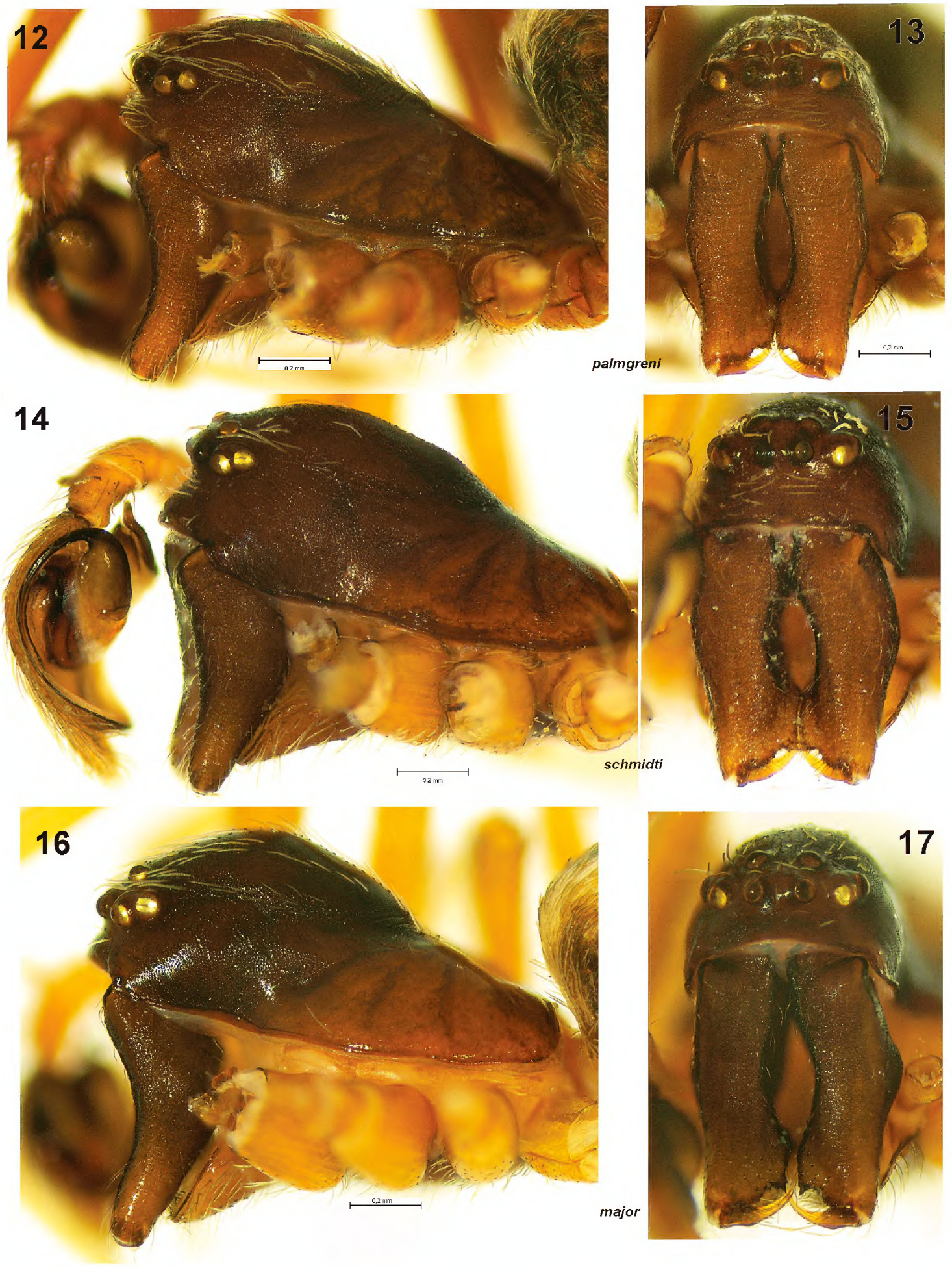


Figures 6–11. Prosoma and abdomen of *Dictyna palmgreni* sp. n. **6–9** and *D. schmidti* **10–11**. **6, 10** – male carapace, lateral **7** male abdomen, dorsal **8–9** female abdomen, dorsal **11** prosoma, frontal **6 10–11** from the Upper Kolyma **7** from Krasnoyarsk Province **8–9** from Basegi (Ural).

km downstream off Zhigansk, mouth of Ynyr Khaya Spring, stony bank and meadows, 4-8.07.1989 (K.Yu. Eskov). ***Magadan*** Area: 1♂ (ZMMU), Upper Kolyma flow, Sibit Tyellakh River basin, Olen' River valley, environs of "Aborigen" Field Station, on ice field, 600 m, 7.06.1985 (Yu.M. Marusik).

Diagnosis. *Dictyna palmgreni* sp. n. resembles *D. major* and *D. schmidti*, from which it can be easily separated by the shape of the apical portion of the conductor (broadening and then abruptly tapering, not gradually tapering like in the other two species), the relatively short cymbium, the thick and spiralled epigynal ducts and also by the presence of a digitiform process (accessorial gland). In the male palp, the combination of short length and basal placement of the tibial apophysis also distinguishes it from the two other species.

Description. Male. Total length 2.63-3.00. Carapace: 1.10-1.30 long, 0.88-0.95 wide, cephalic part 0.60 wide, clypeus 0.14, chelicerae 0.79. Abdomen 1.75 long, 1.20 wide. Cymbium 0.69-0.79 long, 0.40-0.43 wide, length/width ratio 1.70-1.80. Leg I segments: femur 1.17, patella+tibia 1.36, metatarsus 0.86, tarsus 0.57. Carapace brown, cephalic part raised, well separated from thoracic part by 'furrow', cephalic portion with 5 longitudinal 'furrows' with sparse whitish hairs, thoracic part with radial stripes. Abdomen light to dark brown with dark grey-brownish pattern (Figs 1, 7), somewhat variable and sometimes with cardiac mark posteriorly trifid. Palp as in Figs 18-19, 22-23, tibia short, apophysis carrying ctenidia short (about 2 lengths of



Figures 12–17. Male prosoma of *Dictyna palmgreni* sp. n. **12–13** from Pallastunturi, *D. schmidti* **14–15** from Yakutia and *D. major* **16–17** from Pyhtää **12, 14, 16** lateral **13, 15, 17** frontal.

ctenidia) and positioned near base of tibia; conductor in one plain, upper arm of conductor abruptly cut, lower arm with bent thin tip directed retrolaterad.

Female. Total length 2.90-3.10. Carapace: 1.05-1.18 long, 0.91-0.94 wide, brown with dark-grey radial stripes, and light brown median band (behind posterior eye row). Cephalic portion with 5 longitudinal 'furrows' densely covered with whitish hairs. Clypeus 0.13, chelicerae 0.60. Leg I segments: femur 1.07, patella+tibia 1.14, metatarsus 0.69, tarsus 0.50. Abdomen light brownish with brown pattern as in Figs 2, 8-9, usually with cardiac mark posteriorly distinctly trifid, venter with median dark band. Epigyne as in Figs 28-30, 32-33 with thin septum and rather long margins. Vulvae with spiralled insemination ducts terminated by spiralled 'receptacula'. 'Receptacula' with digitiform cylindrical accessorial gland.

Distribution. The new species is known across almost the entire northern Palaearctic: from Fennoscandia to Magadan, north to 68° in Finland, and southward to about 53° in Krasnoyarsk Province of Russia. To date, there have apparently been no documented adult specimens from Sweden (L. Jonsson & R. Pettersson pers. comm.), which are needed for the confirmation of its occurrence there.

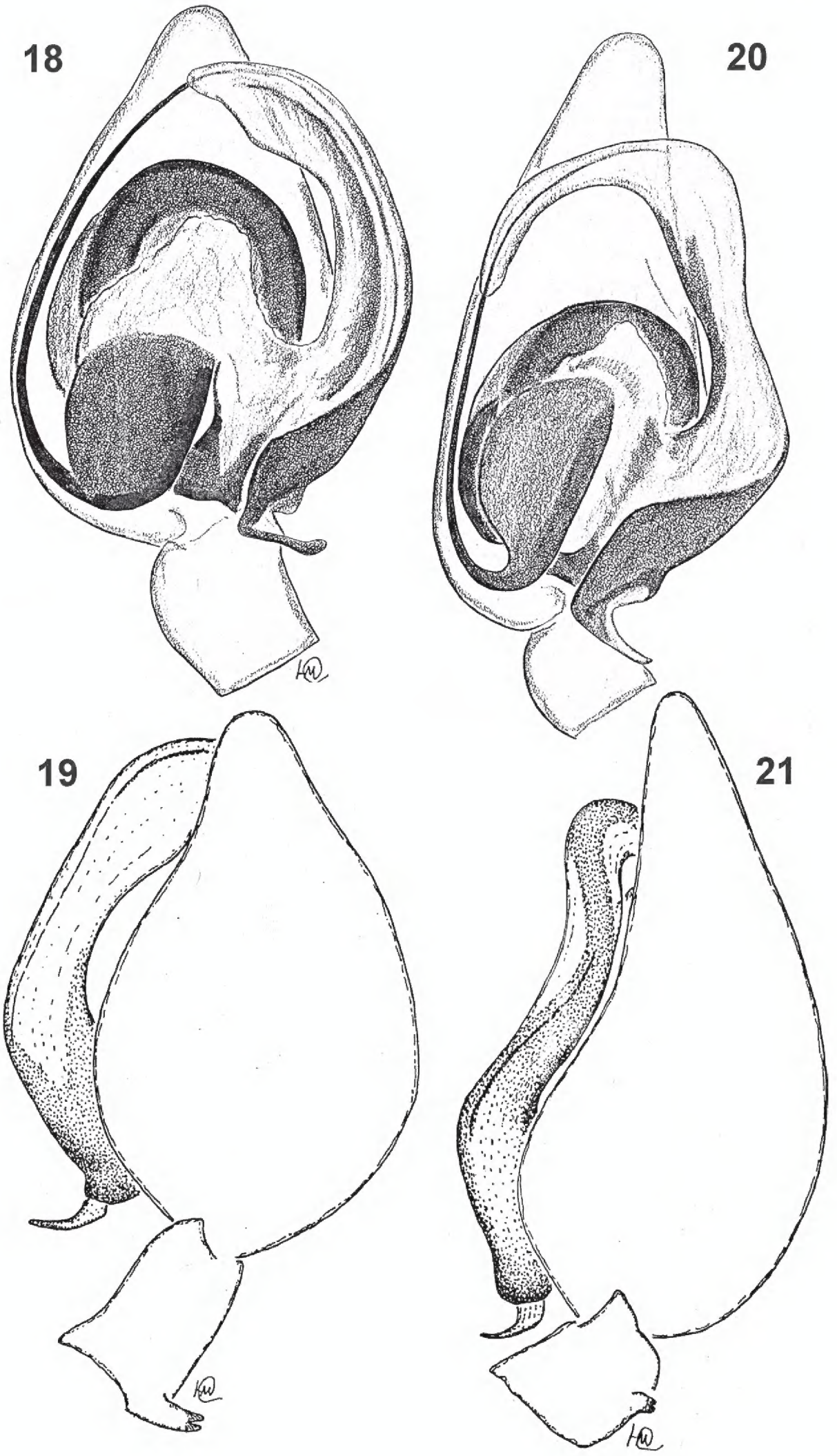
Natural history. Adult females occur from late May throughout the summer, males from late May to at least the beginning of July. Finnish specimens have mainly been collected from stands dominated by Norway spruce (*Picea abies*), and often on moist ground (swampy forest or mires). At least to some extent the species is arboreal, but some specimens have been caught using pitfall-traps and some apparently live in open habitats.

***Dictyna schmidti* Kulczyński, 1926**
http://species-id.net/wiki/Dictyna_schmidti
Figs 3, 10–11, 14–15, 20–21, 24–25, 31, 40

D. schmidti Kulczyński, 1926: 37, pl. 2, f. 1-3 (♂; the ♂ holotype not examined).
D. shilenkovi Danilov, 2000: 42, f. 17-20 (♂♀), syn. n. (the ♂ holotype not examined).

Faunistic references
D. schmidti: Marusik et al. 1992: 137.
D. schmidti: Marusik et al. 1993: 71.
D. schmidti: Marusik 1988: 1482; 2005a: 266; 2005b: 190.
D. shilenkovi: Trilikauskas 2008: 38.

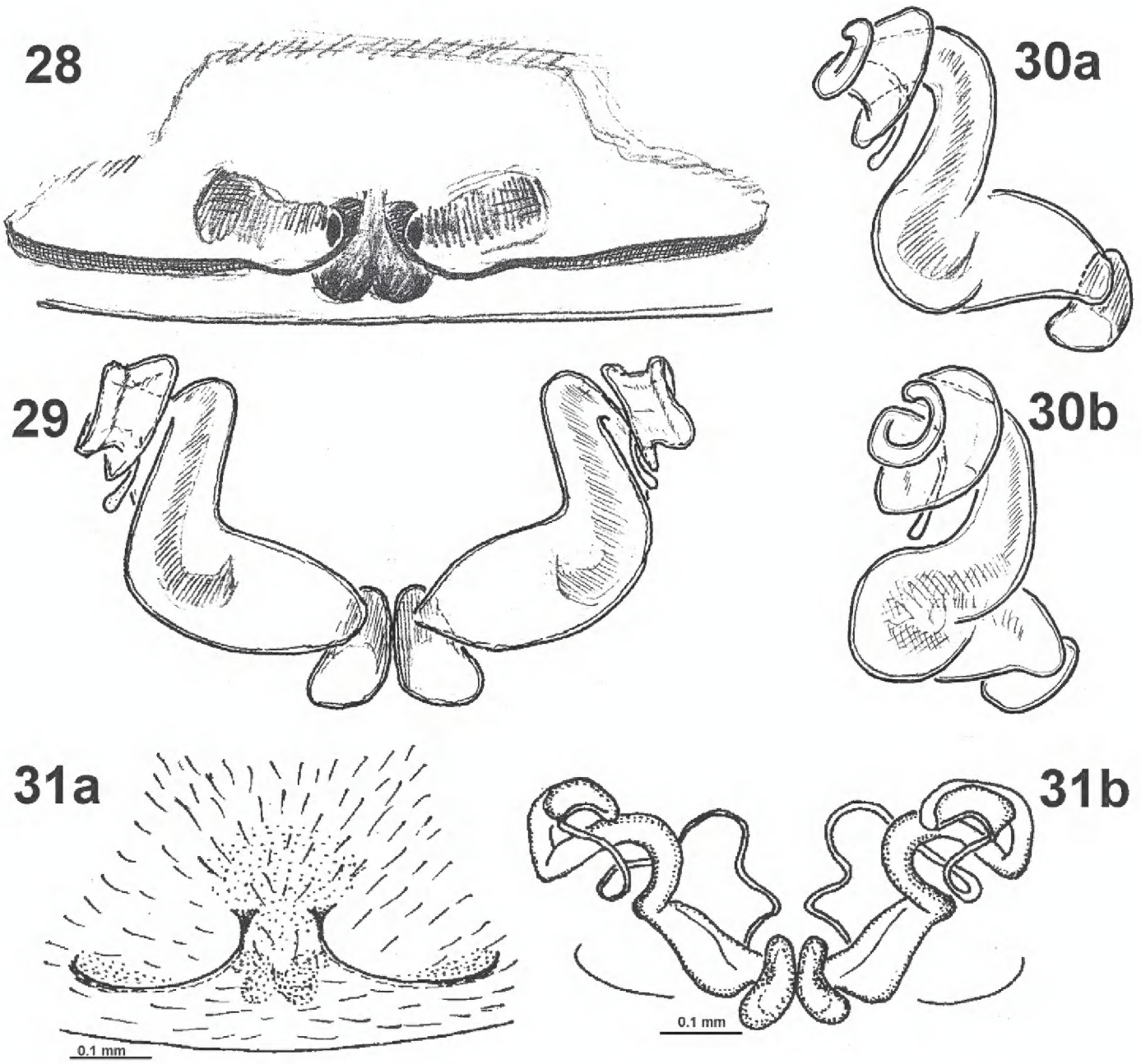
Remarks. The ♂ holotype from Klutschevskoje, Kamchatka retained in the Institute of Zoology PAN (Warsaw, Poland) has not been found. The ♂ holotype of *D. shilenkovi* and two ♀ paratypes indicated as being deposited in the Zoological Museum of the Moscow State University (see Danilov 2000) have not been found there.



Figures 18–21. Male palp of *Dictyna palmgreni* sp. n. **18–19** and *D. schmidti* **20–21** from the Upper Kolyma **18, 20** ventral **19, 21** retrolateral.

Figures 22–27. Male palp of *Dictyna palmgreni* sp. n. **22–23** from Pallastunturi, *D. schmidti* **24–25** from Yakutia and *D. major* **26–27** from Pyhtää **22, 24, 26** ventral **23, 25, 27** retrolateral.

Material examined. RUSSIA: ***Yakutia*:** 1♂ (IBPN), c. 10 km downstream of Zhigansk, mouth of Ynyr Khaya Spring, 4-8.07.1989 (K.Yu. Eskov). ***Magadan*** Area: 1♂, 50 km N of Magadan, Khasyn River valley near Splavnaya Village, 28.05.1988 (Yu.M. Marusik & S.A. Ryabukhin); 1♂ (IBPN), upper Kolyma River flow, Sibit Tyellakh River basin, Olen' River valley, environs of "Aborigen" Field Station, around ice field, sweeping grass near alder stand, h 650m, 27.07.1987 (Yu.M. Marusik); 1♂ (IBPN), 180 km W of Magadan, Cholomdzha River middle flow, 1988 (N.Y. Dokuchaev); 1♂, Taigonos Peninsula, Paren' River middle flow, 07.1985 (A. Meshcheryakov).



Figures 28–31. Epigyne of *Dictyna palmgreni* sp. n. **28–30** from Basegi (Ural) and *D. schmidti* **31. 28, 31a** epigyne, ventral **29, 31b** sclerotised part of receptacula **30a,b** left receptaculum, different aspects. **31** after Danilov (2000), sub. *D. shilenkovi*.

Description. Male. For details see Kulczyński (1926) and Danilov (2000: sub. *D. shilenkovi*). Carapace 1.35 long, 1.07 wide, cephalic part 0.52 wide. Chelicerae 0.75 long. Leg I segments: femur 1.15, patella & tibia 1.43, metatarsus 0.91, tarsus 0.58. Abdomen 1.60 long, 1.10 wide. Palp as in Figs 20-21, 24-25; process carrying ctenidia located in mid part of tibia, very small; conductor long, three-dimensional (not in one plain), its apical arm gradually tapering and terminating on prolateral side, lower arm small and directed retrolaterad-backward.

Female. Described by Danilov (2000: sub. *D. shilenkovi*). Paratypes have not been available for this study. Epigyne (Figs 31a-b) with thin sclerotized parts of receptacula.

Distribution. This species is known from East Siberia only (Fig 40): from Transbaikalia, northward to Zhigansk, southward to Ulan-Ude (Buryatia) and Bureinski Reserve (Khabarovsk Province) and eastward to Kamchatka.

Natural history. One specimen was collected by sweeping grasses on a north exposed slope in the Upper Kolyma. One male near Magadan was found under stones. The type specimens of *D. shilenkovi* were mainly collected from mixed forests (Danilov 2000).

Dictyna major Menge, 1869

http://species-id.net/wiki/Dictyna_major
Figs 4–5, 16–17, 26–27, 34–39

D. m.: Wiehle 1953: 100, f. 218-221 (♂♀).
D. m.: Chamberlin & Gertsch 1958: 82, pl. 24, f. 2-4 (♂♀).
D. m.: Roberts 1985: 50, f. 14c (♂♀).
D. m.: Roberts 1995: 84, f. (♂♀).
D. m.: Roberts 1998: 86, f. (♂♀).
D. m.: Paquin & Dupérré 2003: 68, f. 563-565 (♂♀).
D. m.: Almquist 2006: 314, f. 274a-g (♂♀).
D. schmidti: Almquist 2006: 316, f. 276a-d (♂♀) (seems a misidentification).
For a complete list of references see Platnick (2011).

Material examined. FINLAND: 1♂ 8♀ 1j (NRF), Pyhtää, Kaunissaari 60°21'42"N 26°46'50"E, dune shore with sparse *Leymus arenarius*, 9.06.2009 (N.R. Fritzén); 1♂ (NRF), Lohtaja, Vattajanniemi 64°00'34"N 23°23'26"E, in vegetation on dune shore, 7.06.2010 (N.R. Fritzén); 1♂ Kalajoki, Letto 64°17'02"N 23°52'32"E, dune shore with sparse vegetation, 8.06.2010 (N.R.Fritzén); 1♂ 1♀ (ZMT) Utsjoki, Lohva, 12.07.1962 (P.T. Lehtinen). **CANADA**: **Yukon** Territory: 3♂ 4♀ (IBPN) Kluane Lake, environs of research station, south bank of the lake, 5-11.07.1993 (Yu.M.Marusik); 1♀ (IBPN) environs of Carmacks, 135°55'W 62°04'N, steppe slope and surroundings, 18.07.1993 (Yu.M.Marusik).

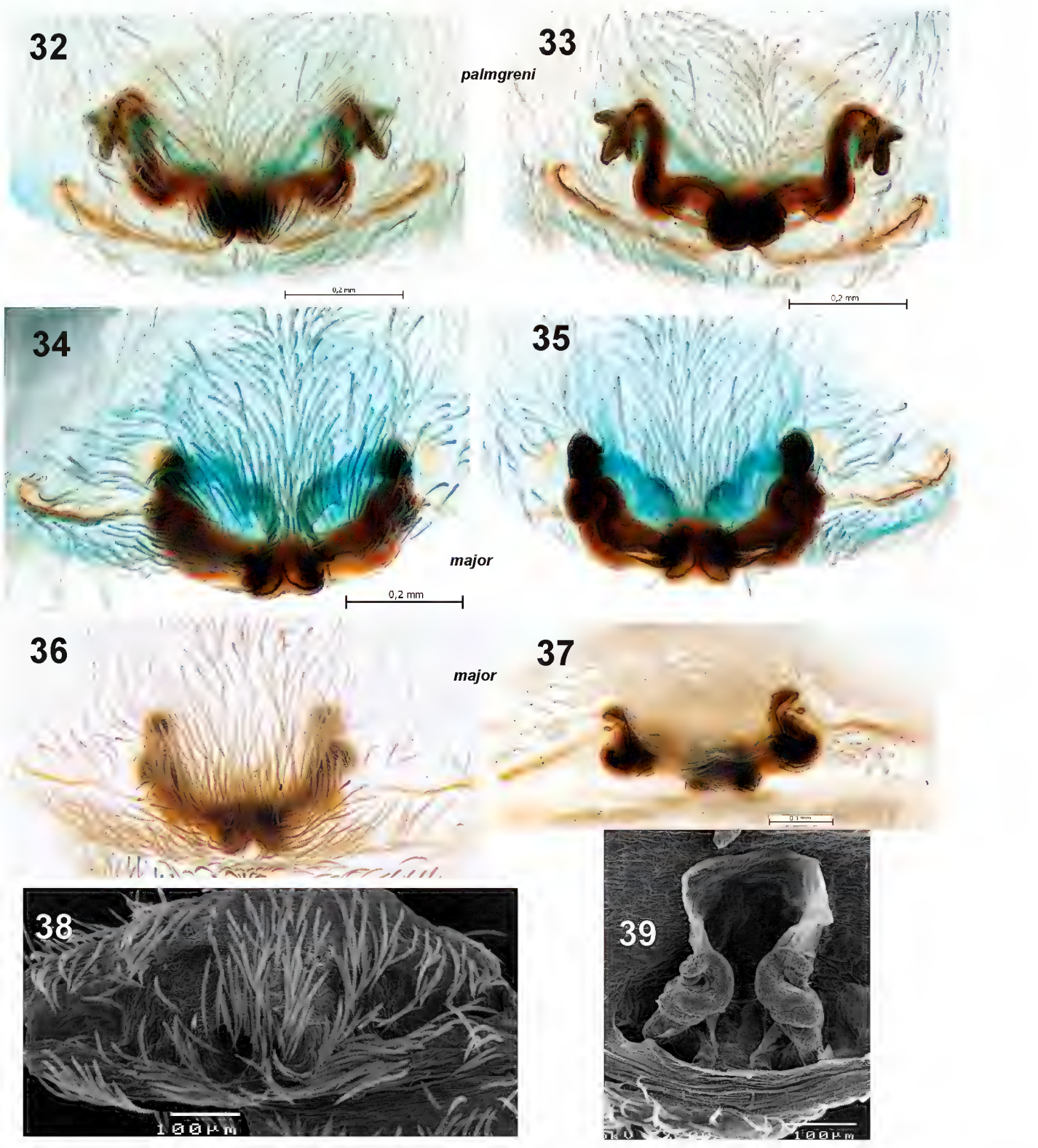
Numerous specimens from Tuva (Marusik et al. 2000), North-East Siberia (Marusik et al. 1992), Yakutia (Marusik et al. 1993), Greenland (Marusik et al. 2006) have also been examined.

Comments. It has not been possible to trace the Finnish specimens used for making the figures of *D. schmidti* in Almquist (2006). The illustrations are probably based on misidentified specimens and seem to refer to *D. major*.

Description. Thoroughly described by Wiehle (1953), Chamberlin & Gertsch (1958) and Almquist (2006). Here we provide only comparative figures of the copulatory organs in order to demonstrate differences between it and the similar-looking *D. palmgreni* sp. n. and *D. schmidti.*

Distribution. The species has a circum-Holarctic range and is known across the Palaearctic and Nearctic Regions.

Natural history. This species has different habitat preferences in Siberia and in Finland. In Magadan Area, it is the most common dictynid species, occurring in vari-



Figures 32–39. Epigyne of *Dictyna palmgreni* sp. n. **32–33** from Pallastunturi and *D. major* **34–39** from Pyhtää **32, 34, 36, 38** macerated epigyne, ventral **33, 35, 39** macerated epigyne, dorsal **37** macerated epigyne showing sac-like structure, frontal. Sac-like structure on Fig. **39** collapsed and sclerotised parts of epigyne became closer.

ous habitats within the forest belt and is most numerous on *Ledum* shrubs. In Finland, *D. major* is rare, has a scattered distribution and occurs exclusively on dune shores.

Relationships

Studying the relationships between *Dictyna* and the related *Emblyna* Chamberlin, 1948 faces certain difficulties. Both genera are species diverse, especially in the Nearc-

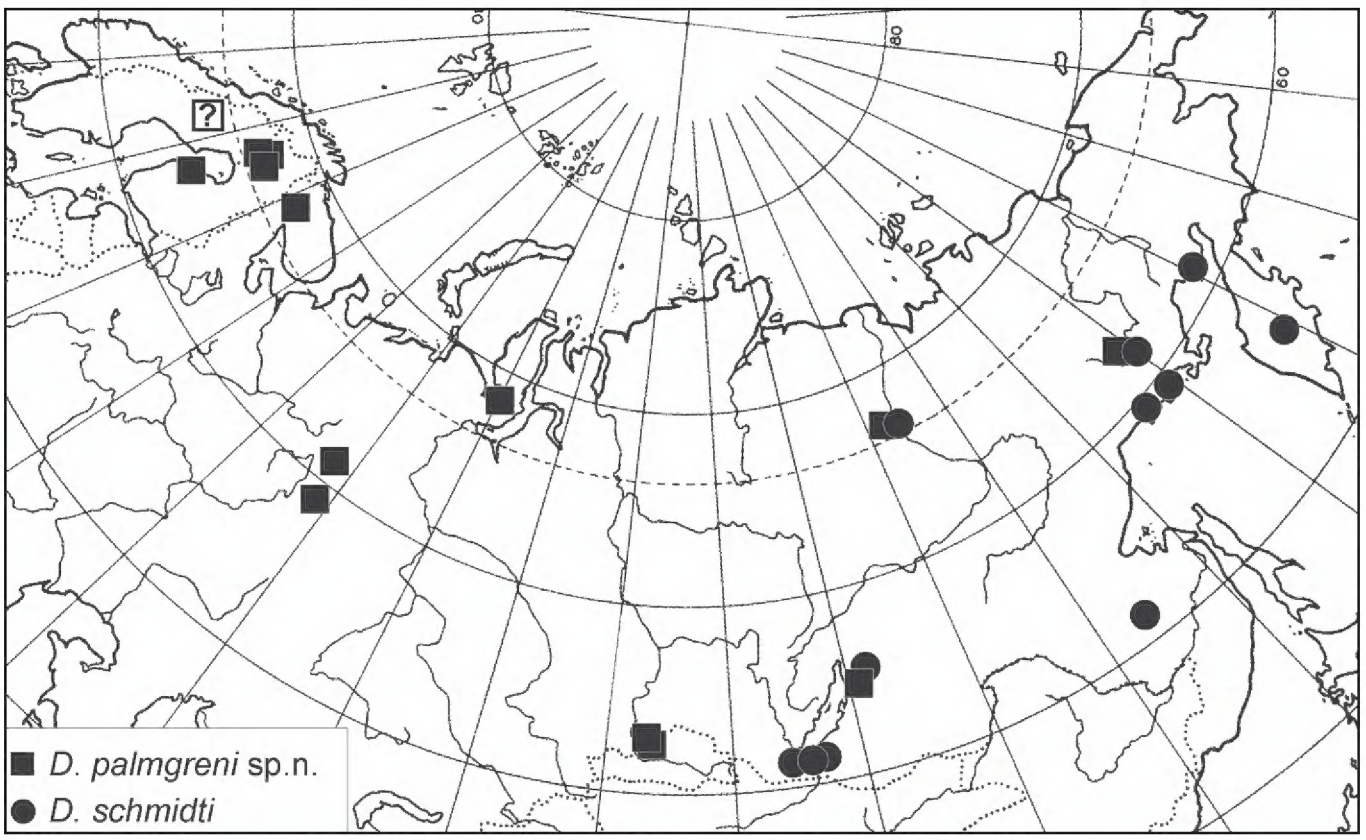


Figure 40. Distribution map of *D. palmgreni* sp. n. (square) and *D. schmidti* (dot).

tic, and their proper revisions in the Holarctic are lacking. Besides, data on the internal structure of the epigyne of the majority of Nearctic species is also lacking. Although males of the three species *D. major*, *D. palmgreni* sp. n. and *D. schmidti* have similar palps, it is not clear whether they are related or not. The epigynes of these species are rather different. The copulatory openings of *D. major* and *D. palmgreni* sp. n. are similar, but those of *D. palmgreni* sp. n. have a unique digitiform process of receptaculum which is absent in other *Dictyna* species known to us. The epigyne of *D. schmidti* differs significantly from both *D. major* and *D. palmgreni* sp. n. The male palp of *D. schmidti* and *D. szaboi* Chyzer, 1891 1891 (cf. Gajdos and Pekár 1999: figs. 1-4) is also rather similar, both having a very long 3-dimensional conductor and a small tibial dorsal process. The vulva of *D. szaboi* has never been illustrated.

Notes on the structure of the internal part of epigyne in Dictyninae

While studying the epigynes of *D. palmgreni* sp. n., *D. major* and some other *Dictyna* and *Ajmonia* species we have found large transparent sac-like structures (cf. Figs. 32-35, 37, 39; Figs. 5, 21 in Marusik and Koponen 1998; Fig. 2 in Marusik et al. 2006; Fig. 1i in Marusik & Esyunin 2010). Other authors have never reported on such structures. When we had prepared a specimen for making SEM photographs and transferred it from alcohol to a filter paper for drying up, the sac-like structure resembled a plastic bag, which immediately collapsed as soon as the filter paper was touched (cf. Fig. 39). Considering the very small size of the *Dictyna* receptacula, it seems that the sac-like structure serves as an additional unpaired receptaculum. We do not know any similar structures in other families belonging to the RTA-clade. Somewhat similar,

unpaired transparent receptacula are known in Dysderidae, Oonopidae and the related haplogyne families (Figs 830-835 in Forster and Platnick 1985), but these are situated below the epigastric furrow and behind the unpaired "receptaculum". In Dictyninae, the sac-like structure is situated between the integument and the paired receptacula.

Acknowledgements

We want to thank the following persons for loans and various kinds of help: Seppo Koponen (ZMT), Timo Pajunen (ZMH), Heikki Hippa (NHRS), Kirill Eskov (Moscow), Torbjörn Kronestedt (NHRS), Laimonas Trilikauskas (Novosibirsk), and Terecia Fritzén for proof-reading the English of the earlier draft. English of the final draft was checked by Donald Buckle (Saskatoon, Canada). This work was supported in part by the RFFI grants # 09-04-01365 and 11-04-01716-a.

References

Almquist S (2006) Swedish Araneae, part 2 – families Dictynidae to Salticidae. Insect Systematics, Evolution 63(Suppl.): 285-601.

Chamberlin RV, Gertsch WJ (1958) The spider family Dictynidae in America north of Mexico. Bulletin of the American Museum of Natural History 116: 1-152.

Danilov SN (1994) Cribellate spiders (Aranei, Cribellatae) of Transbaicalia. Entomologicheskoye Obozreniye 73: 200-209. [In Russian]

Danilov SN (2000). New data on the spiders of the family Dictynidae (Araneae) from Siberia. Ekológia (Bratislava) 19(Suppl. 3): 37-44.

Esyunin SL, Efimik VE (1996) Catalogue of the spiders (Arachnida, Aranei) of the Urals. KMK Scientific Press Ltd, Moscow: 229 pp.

Forster RR, Platnick NI (1985) A review of the austral spider family Orsolobidae (Arachnida, Araneae), with notes on the superfamily Dysderoidea. Bulletin of the American Museum of Natural History 181: 1-230.

Gajdos P, Pekár S (1999) *Dictyna szaboi* Chyzer, a cribellate spider recently found in Slovakia (Araneae: Dictynidae). Acta Univiversitatis Carolinae-Biologica 43: 3-5.

Kulczyński W (1908) Araneae et Oribatidae. Expeditionum rossicarum in insulas Novo-Sibiricas annis 1885-1886 et 1900-1903 susceptarum. Zapiski imperatorskoi Akademii Nauk (8) 18(7): 1-97.

Kulczyński W (1916) Araneae Sibiriae occidentalis arcticae. Zapiski imperatorskoi Akademii Nauk (8) 28(11): 1-44.

Kulczyński W (1926) Arachnoidea Camtschadalica. Yezhegodnik Zoologicheskogo Muzeya Akademii Nauk SSSR 27: 29-72.

Lehtinen PT (1967) Classification of the cribellate spiders and some allied families, with notes on the evolution of the suborder Araneomorpha. Annales Zoologici Fennici 4: 199-468.

Logunov DV, Marusik YM, Koponen S (1998) A check-list of the spiders in Tuva, South Siberia with analysis of their habitat distribution. Berichte des naturwissenschaftlich-medizinischen Vereins in Insbruck 85: 125-159.

Marusik YM (1988) New species of spiders (Aranei) from the Upper Kolyma. Zoologicheski Zhurnal 67: 1469-1482.

Marusik YM (2005a) Arachnids (Arachnida: Aranei, Opiliones) of northern Cisokhotia. Euroasian Entomological Journal 4(3): 187-208. [In Russian]

Marusik YM (2005b) Spiders and harvestmen of the Taui Bay shore and adjacent parts of northern Cisokhotia. In Chereshnev IA, Chernyavski FB, Kashin VA (Eds) Biodiversity of Tauysk Bay of the Sea of Okhotsk: 262-289. [In Russian]

Marusik YM, Esyunin SL (2010) On the northernmost *Ajmonia* Caporiacco, 1934 (Aranei: Dictynidae: Dictyninae). Journal of natural History 44: 361-367.

Marusik YM, Koponen S (1998) New and little known spiders of the subfamily Dictyninae (Araneae: Dictynidae) from south Siberia. Entomological Problems 29: 79-86.

Marusik YM, Böcher J, Koponen S (2006) The collection of Greenland spiders (Aranei) kept in the Zoological Museum, University of Copenhagen. Arthropoda Selecta 15(1): 59-80.

Marusik YM, Eskov KY, Kim JP (1992) A check-list of spiders (Aranei) of Northeast Asia. Korean Arachnology 8(1/2): 129-158.

Marusik YM, Eskov KY, Koponen S, Vinokurov NN (1993) A check-list of the spiders (Aranei) of Yakutia, Siberia. Arthropoda Selecta 2(2): 63-79.

Marusik YM, Logunov DV, Koponen S (2000) Spiders of Tuva, South Siberia. Magadan: IBPN FEB RAS, 252 pp.

Mikhailov KG (1997) Catalogue of the spiders of the territories of the former Soviet Union (Arachnida, Aranei). Zoological Museum of the Moscow State University, Moscow, 416 pp.

Palmgren P (1977) Die Spinnenfauna Finnlands und Ostfennoskandiens. VIII. Argyronetidae, Agelenidae, Hahniidae, Dictynidae, Amaurobiidae, Titanoecidae, Segestriidae, Pholcidae und Sicariidae. Fauna Fennica 30: 1-50.

Paquin P, Dupérré N (2003) Guide d'identification des araignées de Québec. Fabreries, Suppl. 11: 1-251.

Pettersson RB (1996) Effect of forestry on the abundance and diversity of arboreal spiders in the boreal spruce forest. Ecography 19: 221-228.

Platnick NI (2011) The world spider catalog, version 12.0. American Museum of Natural History. http://research.amnh.org/iz/spiders/catalog.

Roberts MJ (1985) The spiders of Great Britain and Ireland, Volume 1: Atypidae to Theridiosomatidae. Harley Books, Colchester, 229 pp.

Roberts MJ (1995) Collins Field Guide: Spiders of Britain, Northern Europe. HarperCollins, London, 383 pp.

Roberts MJ (1998) Spinnengids. Tirion, Baarn, 397 pp.

Trilikauskas L (2008) Structure of the spider population in forest ecosystems of the Bureinski Reserve. Trudy gosudarstvennogo prirodnogo zapovednika "Bureinskiy" 4: 36-44. [In Russian]

Wiehle H (1953) Spinnentiere oder Arachnoidea (Araneae) IX: Orthognatha-Cribellatae-Haplogynae-Entelegynae (Pholcidae, Zodariidae, Oxyopidae, Mimetidae, Nesticidae). Tierwelt Deutschlands 42: 1-150.